

## **Request for Economic Stimulus Funds**

### **Concept Proposal**

#### **Submitters (Name of Workgroup & Chair/Co-Chairs):**

Robin Zhang, Murray State University

Bob Jost, Purchase Area Development District, Mayfield, KY

#### **Project Title:**

Assessing and monitoring the impact of the 2009 ice storm on forest communities in the Purchase region of western Kentucky

#### **Project Partners (Known or Anticipated):**

Dr. Kate He, Department of Biological Sciences, Murray State University

Xulong Peng, Purchase Area Development District, Mayfield, KY

Dr. Songlin Fei, Department of Forestry, University of Kentucky

#### **Project Background & Purpose (Justification for Project):**

Trees with various life history traits play vital roles in our economy and our environment. They filter the air we breathe, provide food and shelter to wildlife, hold the soils together and stabilize slopes, and reduce the dangers of flash floods, among other benefits. The Purchase region of western Kentucky is among the hardest hit during the recent deadly ice storm of 2009. Trees have suffered great damage during the storm. The reduced tree canopy and coverage may negatively impact the health of forests, cause reduction in wildlife habitats, increase wildfire threat and the frequency of flash floods. It is worthwhile to assess tree damage, compositional change of forest communities, and monitor the long-term environmental and ecological impacts of the ice storm.

The tree damage is evident on the ground. However, it is very time consuming, expensive and sometimes impractical to survey the overall damage through ground observations. Furthermore, the continuous monitoring of forest recovery and health needs a procedure that is fast and covers a large area. Remote sensing collects data about the earth's surface from above. Since data can be acquired repeatedly over the same geographic region by the same sensors, remote sensing has been used to map many types of environmental changes including the aftermath of natural disasters.

This project could be the first remote sensing based attempt towards assessing tree damage and forest compositional change caused by the 2009 ice storm for the entire Purchase region. It utilizes the widely available Landsat TM imagery as the main source of data. The project would establish a collaboration relationship between the project partners. It would give students the opportunity to research the impact of a significant recent event that they can relate to very well. In addition, the procedure proposed in this project could be applied to other communities that were hit by the ice storm or other natural disasters such as tornadoes that result in tree damage.

### **Project Description (General Goals & Implementation Strategies):**

The objective of this project is to assess and monitor the impact of the 2009 ice storm on forest communities in the Purchase region of western Kentucky, using Landsat TM images. Landsat TM imagery is the most accessible multispectral satellite imagery that provides medium resolution data in seven multispectral bands (30m for bands 1-5, 7 and 120 m for band 6), covering 185 km swath every 16 days. Landsat TM images of summer 2008, the last growing season before the ice storm, will serve to establish the baseline. Images will be acquired every summer around the same date for continued monitoring for the next 10-20 years. The same procedure will be developed and applied to the mapping of the entire Purchase region. The forest covered area will be mapped every year, along with derived measurements that show forest health and recovery, such as vegetation indices, foliar mass and moisture content. The utility of different Landsat TM spectral bands or the combination of the bands will be explored for the purpose of the study.

### **Project Team (Project Manager(s), Content Experts, Instructional Designers, etc.):**

Managers: Robin Zhang and Bob Jost

Content experts: Robin Zhang, Bob Jost, Xulong Peng, Kate He, Songlin Fei

**Project Budget & Amount of Economic Stimulus Funds Requested:**

Estimated budget: \$80-100,000 per year

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